

REMARKS

This amendment is in reply to the Office Action dated July 8, 2003.

Claims 21, 25, and 37-105 are pending in this application, with claims 21, 25, 37-39, and 49-56 being independent. Claims 21, 25, 37, 38, 39, 49, 50, 51, 52, 53, and 54 have been amended, and dependent claims 97-105 have been added. Support for the claim amendments and new claims may be found, for example, in Figs 9A-9D of the specification and the accompanying text.

Independent claims 21, 25, 37-39, and 49-56 have been rejected along with their dependent claims 40-48 and 57-96 as being unpatentable over Nakajima (U.S. Patent No. 5, 712, 191) in view of Yamada (JP5-109,737).

Claim 21 has been amended to recite a method for manufacturing a semiconductor device including introducing an ion of an element which is inert into a selected portion of a semiconductor film “using a first mask covering a first portion of said semiconductor film provided over said semiconductor film ... forming a second mask over said semiconductor film; *and etching a part of said first portion of said semiconductor film and said selected portion of said semiconductor film using said second mask after said heating to form an active layer of said semiconductor device*” (emphasis added). Applicant requests reconsideration and withdrawal of the rejection of claim 21 and its dependent claims because neither Nakajima, Yamada, nor any combination of the two describes or suggests the recited operations of introducing ions using a first mask, forming a second mask, and using the second mask to etch both the portion of the semiconductor film in which the ions were introduced (i.e., the selected portion) and a portion of the semiconductor film in which the ions were not introduced because the portion was covered by the first mask (i.e., part of the first portion).

Nakajima discloses a method of selectively crystallizing amorphous silicon by using a layer of a metal element that accelerates the crystallization process. Nakajima, however, does not describe or suggest the recited introduction of ions into a semiconductor film using a first mask and subsequent etching, using a second mask, of the ion introduced portions and a portion covered by the first mask.

Yamada describes implanting ions into an element non-forming region 3 of an amorphous silicon film 4 to form a gettering layer 7 by using a photoresist film 6 as a mask covering an element forming region 2 of an amorphous silicon film 4 (Fig. 1 of Yamada). Yamada describes annealing the amorphous silicon film 4 to crystallize it and then removing the gettering layer 7 (pages 5-6, of Yamada translation). Yamada, however, does not describe or suggest using a second mask to remove or etch any portion of the crystallized semiconductor film 4 in the element forming region 2 that was covered by the photoresist film 6 used to implant the ions. Rather, Yamada describes and suggests only removing the gettering layer 7 in the element non-forming region 3 (Figs. 1-2 of Yamada) without removing a portion of the crystallized silicon film 4 in the element forming region 2.

For at least these reasons, no proper combination of Nakajima and Yamada describes or suggests the claimed combination of steps, and, accordingly, applicant requests withdrawal of the rejection of claim 21 and its dependent claims.

Claim 25, which also recites introducing ions of an inert element, claims 37-39, which recite introducing phosphorous, and claims 49 and 50, which recite introducing argon ions, have been amended in the same way as claim 21. Accordingly, applicant requests withdrawal of the rejection of claims 25, 37-39, 49, and 50, and their dependent claims, for at least the same reasons as those discussed above in reference to claim 21.

Claims 51 and 52 have been amended to recite a method for manufacturing a semiconductor device including forming a semiconductor island, providing the semiconductor island with a crystallization promoting material, introducing an argon ion into a selected portion of the semiconductor island, heating the semiconductor island, and "*removing said selected portion of said semiconductor island and a part of said semiconductor island adjacent to said selected portion* in order to form an active layer of said semiconductor device" (emphasis added). Applicant requests reconsideration and withdrawal of the rejection of claims 51 and 52, and their dependent claims because neither Nakajima, Yamada, nor any combination of the two describes or suggests the recited removing step for at least the same reasons as those discussed above in reference to claim 21.

Claims 53 and 54 have been amended to recite a method for manufacturing a semiconductor device including forming a semiconductor film, providing the semiconductor film with a crystallization promoting material, introducing an argon ion into a selected portion of the semiconductor film using a mask provided over the semiconductor film, heating the semiconductor film, and “*etching said selected portion of said semiconductor film and a part of said semiconductor film covered with said mask*” in said introducing step after said heating to form an active layer of the semiconductor device, wherein said part of said semiconductor film covered with said mask in said introducing step is adjacent to said selected portion” (emphasis added). Applicant requests reconsideration and withdrawal of the rejection of claims 51 and 52, and their dependent claims, because neither Nakajima, Yamada, nor any combination of the two describes or suggests the recited etching step for at least the same reasons as those discussed above in reference to claim 21.

Claims 55 and 56 recite a method for manufacturing a semiconductor device including introducing an argon ion into a selected portion of a semiconductor film “using a first mask covering a first portion of said semiconductor film provided over said semiconductor film ... forming a second mask over said semiconductor film; and etching a part of said first portion of said semiconductor film and said selected portion of said semiconductor film using said second mask after said heating to form an active layer of said semiconductor device” (emphasis added). Applicant requests reconsideration and withdrawal of the rejection of claims 55 and 56, and their dependent claims, because neither Nakajima, Yamada, nor any combination of the two describes or suggests the recited operations for at least the same reasons as those discussed above in reference to claim 21.

Applicants submit that all claims are in condition for allowance.

Applicant : Hisashi Ohtani, et al  
Serial No. : 08/690,747  
Filed : August 1, 1996  
Page : 19 of 19

Attorney's Docket No.: 07977-052001 US3053

Enclosed is a \$770.00 check for the Request for Continued Examination (RCE). Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 10/8/03

  
John F. Hayden  
Reg. No. 37,640

Fish & Richardson P.C.  
1425 K Street, N.W.  
11th Floor  
Washington, DC 20005-3500  
Telephone: (202) 783-5070  
Facsimile: (202) 783-2331

40180788.doc